**Cell Structure and Function Unit Plan**

Part 1: Textbook Concept list

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| --- | --- | --- | --- |
| Concept | Definitely Include? | Maybe Include? | Don’t Include? |
| Cell theory | Cell cross section activity, history of the cell and cell theory, the statements of cell theory | Information about different types of mircroscopy |  |
| Characteristics of Prokaryotes/Eukaryotes | Size, genetic material storage, differences and similarities | Exceptions in sizes | Venn diagram of commonalities |
| Functions of cell structures | Different components and functions, organelles, plant vs. animal, differences in mitochondria vs. chloroplasts, cytoskeleton | Model cell activity, microfilaments and microtubules. |  |
| Functions of Cell Membrane and Cell Wall | Structure and function of the membrane and wall, regulation of what enters/exits, why cell walls are not around most animal cells, selectively permeable membrane |  |  |
| Diffusion, Osmosis, and Active transport | Concentrations, equilibrium, movement of molecules, iso- hypo- hypertonic solutions, facilitated diffusion, protein channels, endocytosis, exocytosis, pino- phagocytosis, homeostatsis | Latin meanings behind terms, osmotic pressure, permeability activity |  |
| Cell Specialization | Differentiation among animal cells and plant cells, unicellular vs. multicellular |  |  |
| Organization Levels of Multicellular Organisms | Tissues, organs, organ systems, examples of each that exist within each student |  |  |
| Lab- Cell Structures and Processes | Observation of plant and animal cells, viewing concentration change in a red blood cell. |  |  |

Part II: Illinois Learning Standards Concept List

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| Concept | Descriptor | Definitely Include? | Maybe Include? | Don’t Include? |
| Cell theory | Stage I – 12A: 1 | X |  |  |
| Characteristics of Prokaryotes/Eukaryotes | Stage I – 12A:2 | X |  |  |
| Functions of cell structures | Stage I – 12A:2 | X |  |  |
| Functions of Cell Membrane and Cell Wall | Stage I – 12A:2 | X |  |  |
| Diffusion, Osmosis, and Active transport | Stage H – 12C:1 | X |  |  |
| Cell Specialization | Stage I – 12A: 2 | X |  |  |
| Organization Levels of Multicellular Organisms | Stage I – 12A: 4 | X |  |  |
| Lab- Cell Structures and Processes | Stage I – 11A: 3  Stage I – 12A: 2 | X |  |  |

Use the table below to complete part 3 of your Unit Plan Assignment

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| --- | --- | --- | --- | --- | --- |
| Concept | This Unit? | Another Unit? | Leave Out? | Rationale | Related ILS |
| Cell theory | X |  |  | Cell theory is essential to the understanding of what cells are and how they exist throughout the world. | Stage I – 12A: 1 |
| Characteristics of Prokaryotes/Eukaryotes | X |  |  | These are both important categories of cells because they embody the two different types of life present on Earth. | Stage I – 12A:2 |
| Functions of cell structures | X |  |  | A thorough understanding of the functions and structures of a cell is essential to understanding how a cell works. Also to understand much of the other material in this until they must know this material. | Stage I – 12A:2 |
| Functions of Cell Membrane and Cell Wall | X |  |  | Separating the cell from the extracellular matrix gives the cell it’s shape and construct. This is a must for this lesson not only because of it’s importance to define what a cell is and where it ends but to explain how materials move in and out. | Stage I – 12A:2 |
| Diffusion, Osmosis, and Active transport | X |  |  | Students need to know how molecules move around the cell in order to understand the In order for the student to properly understand how molecules move to suit the needs of the cell | Stage H – 12C:1 |
| Cell Specialization | X |  |  | In order for students to understand how cells are designed to serve different uses they must know about different types of cell specialization. | Stage I – 12A: 2 |
| Organization Levels of Multicellular Organisms | X |  |  | This concept is important because of the fact that in order for students to be able to visualize how cells fit into the grand scheme of organisms, they must see how they gradually accumulate to form various other structures and systems. | Stage I – 12A: 4 |
| Lab- Cell Structures and Processes | X |  |  | In order for the material that the students learned in this unit to be engrained in their minds, they must see the cell structure and functions first hand. This helps the information become concrete. | Stage I – 11A: 3  Stage I – 12A: 2 |

Use the table below to complete parts 4 & 5 of your Unit Plan Assignment.

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| Concept | Objective(s) |
| 1. Cell theory | * Describe and recreate the drawings that Hooke made of the cell given a microscope slide of cork. * List all three components to the Cell Theory. |
| 1. Characteristics of Prokaryotes/Eukaryotes | * Define the characteristics of Prokaryotes and Eukaryotes. * Differentiate between whether or not a particular organism is a prokaryote or eukaryote when presented with various organisms. |
| 1. Functions of cell structures | * Relate concept of the cytoplasm to a real life example. * Name the various cellular structures given a diagram of a cell, nucleus, nucleolus, ribosome, endoplasmic reticulum, Golgi apparatus, lysosome, vacuole, mitochondria, chloroplast, cell membrane, and cell wall. * Describe the functions of the structures of a cell. (listed previously) * Construct an animal or plant cell out of paper, complete with all listed organelles. * Determine the differences between chromatin and chromosomes. * Explain the purpose of vacuoles in cells and what would happen to a cell if there were no vacuoles. * Differentiate between mitochondria and chloroplasts. * Describe how both plant and animal cells attain energy. * Predict how the cell retains its’ structure. |
| 1. Functions of Cell Membrane and Cell Wall | * Identify the composition of the lipid bilayer. * List what type of molecules that can pass through the cell membrane without assistance. * Describe the function of the cell wall. * Define selectively permeable membrane. |
| 1. Diffusion, Osmosis, and Active transport | * Define concentration and explain how it changes through a concentration gradient. * Show how equilibrium is attained in a cell through the various transportation mediums. * Apply the concepts of diffusion to the dye activity. * Define diffusion, osmosis, facilitated diffusion, active transport, exocytosis, endocytosis, hypertonic, and hypotonic solutions. * Describe how osmosis through different solutions with various concentrations. * Conclude how molecules move through a selectively permeable membrane, given an iodine permeability activity. * Diagram how endocytosis and exocytosis occur. |
| 1. Cell Specialization | * Identify organisms as multicellular or unicellular. * Define unicellular, multicellular, and cell specialization. * List five different types of specialized cells in humans. |
| 1. Organization Levels of Multicellular Organisms | * Name the different levels of organization of multicellular organisms. * Categorize sample structures into the levels of organization of multicellular organisms. * Describe how the digestive system in humans is formed down to the individual cells. |
| 1. Lab- Cell Structures and Processes | * Exhibit proper laboratory technique. * Use a microscope to effectively view cells on a sample slide. * Apply concepts of cellular structure to the observation of the onion and cheek cells. * Conclude the outcome of the changes in concentration of the hypertonic and hypotonic solutions. * Design an experiment that uses cells to exhibit hypertonic/hypotonic solutions. |

Use the table below to complete part 6 of your Unit Plan Assignment.

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| --- | --- | --- | --- |
| Objectives | Possible Teaching Strategies | Final Choice | Rationale |
| 1. Describe and recreate the drawings that Hooke made of the cell given a microscope slide of cork.  2. List all three components to the Cell Theory. | Lecture  Hands on activity  Class discussion  Video  Mini-research project  Presentation  Laboratory activity  Role play  Picture analysis  Worksheet | Lecture  Laboratory activity  Worksheet  Class discussion | I would start off using lecture to my students about the history of the cell and the three components of the Cell Theory. Following an introduction to these ideas, I plan to have the students look at a cork cell under a microscope and draw their own conclusions about what they see. Also, I will have them actually draw what they see. After the class has each looked at the samples, then I will have a class discussion about what the students found and how it relates to Hooke’s findings. This would help the students understand how this discover took place in addition to understanding what cells really are as well. |
| 3. Define the characteristics of Prokaryotes and Eukaryotes.  4. Differentiate between whether or not a particular organism is a prokaryote or eukaryote when presented with various organisms. | Lecture  Hands on activity  Class discussion  Video  Mini-research project  Presentation  Laboratory activity  Role play  Picture analysis  Worksheet | Lecture  Video  Worksheet | I would give most of the information about Prokaryotes and Eukaryotes through lecture and a video segment describing the differences and similarities between the two. Once that is complete, then the students will then do a worksheet that will have them tell the difference between the two. |
| 5. Relate concept of the cytoplasm to a real life example.  6. Name the various cellular structures given a diagram of a cell, nucleus, nucleolus, ribosome, endoplasmic reticulum, Golgi apparatus, lysosome, vacuole, mitochondria, chloroplast, cell membrane, and cell wall.  7. Describe the functions of the structures of a cell. (listed previously)  8. Construct an animal or plant cell out of paper, complete with all listed organelles.  9. Determine the differences between chromatin and chromosomes.  10. Explain the purpose of vacuoles in cells and what would happen to a cell if there were no vacuoles.  11. Differentiate between mitochondria and chloroplasts.  12. Describe how both plant and animal cells attain energy.  13. Predict how the cell retains its’ structure. | Lecture  Hands on activity  Class discussion  Video  Mini-research project  Presentation  Laboratory activity  Role play  Picture analysis  Worksheet | Lecture  Hands on activity  Group Presentation  Worksheet  Video  Class discussion | Being that this portion of the unit represents most of the material intensive I would split this among a couple days to make sure that the students really understand each component of the cell. I would briefly lecture on the different cellular structures. Once the class had a basic idea of the components of the cell, I would have them create a short small group presentation on one of the structures of the cell. Using data that I would provide them they will create a quick poster and a short presentation on their topic. I would pass out a worksheet that the students would use to fill in while listening to the other students’ presentations. Then using what they each learned from the presentations, each group would create an animal or plant cell out of craft materials. I would present the students with a worksheet to go along with a video that they would be able to visualize some of the more abstract concepts such as how chromatin becomes chromosomes. Finally after all of the previous work was done and the concepts of what go into a cell were sufficiently established, I would have the students speculate as to how the cell maintains its shape and be able to function. |
| 14. Identify the composition of the lipid bilayer.  15. List what type of molecules that can pass through the cell membrane without assistance.  16. Describe the function of the cell wall.  17. Define selectively permeable membrane. | Lecture  Hands on activity  Class discussion  Video  Mini-research project  Presentation  Laboratory activity  Role play  Picture analysis  Worksheet | Lecture  Role play  Worksheet | I would introduce the ideas of the cell membrane to give the students a background that would prepare them for a role play of the cell membrane. During this role play of the cell membrane some students will be the lipid bilayer, some students will be water molecules, some students will be glucose, and others will be oxygen. I will connect students together by making them form the shape of the molecule and how some molecules cannot fit through the membrane. This will help make the concept of selectively permeable membrane more concrete. Once we were done with this I will give them a worksheet to make sure that they understand the purpose of a membrane and what a selectively permeable membrane is. |
| 18. Define concentration and explain how it changes through a concentration gradient.  19. Show how equilibrium is attained in a cell through the various transportation mediums.  20. Apply the concepts of diffusion to the dye activity.  21. Define diffusion, osmosis, facilitated diffusion, active transport, exocytosis, endocytosis, hypertonic, and hypotonic solutions.  22. Describe how osmosis through different solutions with various concentrations.  23. Conclude how molecules move through a selectively permeable membrane, given an iodine permeability activity.  24. Diagram how endocytosis and exocytosis occur. | Lecture  Hands on activity  Class discussion  Video  Mini-research project  Presentation  Laboratory activity  Role play  Picture analysis  Worksheet | Hands on activity  Lecture  Laboratory activity  Video | I plan on using multiple activities to help my students understand these abstract concepts. The first activity I plan to do is a food dye activity where students can observe the diffusion of food dye molecules throughout a cup of water. Then once they are done recording their observations and drawing what they think happened on a molecular level. They will have investigated and seen what the concentrations before during and after diffusion has taken place. I will then use lecture to explain what has happened to solidify the students understanding of concentrations and diffusion. Also I will lecture on osmosis and its qualities. In particular how it can affect cells in hypotonic, isotonic, and hypertonic solutions. The concept of hypertonic and hypotonic solutions will be further reinforced during the lab activity later. Finally I will have the students do a small lab activity where they will see an iodine filled bag placed in water and the iodine will leave the bag and enter the cup. This will help them visualize the concepts. Once all of that is complete then I will have them watch some short clips on how endocytosis, exocytosis and other forms of active transport take place. |
| 25. Identify organisms as multicellular or unicellular.  26. Define unicellular, multicellular, and cell specialization.  27. List five different types of specialized cells in humans. | Lecture  Hands on activity  Class discussion  Video  Mini-research project  Presentation  Laboratory activity  Role play  Picture analysis  Worksheet | Lecture  Picture analysis  Worksheet | I will lecture about cell specialization briefly being that it is a short component. Following a short lecture session, I will have the students view various pictures of unicellular and multicellular organisms and identify them as either of the types. On the same worksheet, I plan to have them list five different types of specialized cells in humans. These ideas are simple but I think they will get the point across effectively to my students. |
| 28. Name the different levels of organization of multicellular organisms.  29. Categorize sample structures into the levels of organization of multicellular organisms.  30. Describe how the digestive system in humans is formed down to the individual cells. | Lecture  Hands on activity  Class discussion  Video  Mini-research project  Presentation  Laboratory activity  Role play  Picture analysis  Worksheet | Video  Mini-research project | I would begin this concept with a video showing how different cells conglomerate into tissues, and tissues into organs, then organs to organ systems. Understanding this progression is very important to understanding how cells shape the world around us. To make sure students understand this concept entirely, I will have them perform mini-research projects. In this group mini-research project, each group will research various biological systems. Some topics would be the digestive system, tree systems, fungus systems, ect. Upon completing this project the student will hope fully be able to grasp how cells fit into the world around them and inside of them. |
| 31. Exhibit proper laboratory technique.  32. Use a microscope to effectively view cells on a sample slide.  33. Apply concepts of cellular structure to the observation of the onion and cheek cells.  34. Conclude the outcome of the changes in concentration of the hypertonic and hypotonic solutions.  35. Design an experiment that uses cells to exhibit hypertonic/hypotonic solutions. | Lecture  Hands on activity  Class discussion  Video  Mini-research project  Presentation  Laboratory activity  Role play  Picture analysis  Worksheet | Lecture  Laboratory activity | I would lecture first in order to give the students safety information and tell them proper laboratory procedures. Then I would have the students observe a stained onion cell using iodine through a microscope slide.. Then I would have them draw what they see and notice any cellular structures that they can make out. This will help them conceptualize cells and their structures if they actually see them. I would then have them repeat the activity using a check cell from one of the students. This would help show them that they are composed of cells as well. Once that was done, I would have them introduce a red blood cell to both a hypertonic and hypotonic solution. Following their observations, I would have the students design their own experiment using similar procedures on a different cell. They could take this home for homework. If they are the ones designing their experiment then I believe they will be able to understand the inner workings of these cellular processes better. |

Use the table below to complete part 7 of your Unit Plan Assignment.

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| Objectives | Possible Assessment Strategies | Final Choice | Rationale |
| 1. Describe and recreate the drawings that Hooke made of the cell given a microscope slide of cork.  2. List all three components to the Cell Theory. | Exam  Quiz  Essay  Worksheet  Activity participation  Lab participation  Presentation | Worksheet  Activity participation  Unit exam | I will use the filled out worksheet and drawings to determine if the students have understood how the cell was discovered and how knowledge of it has evolved into what it is today. Also, I will determine if they were able to draw some very usable assumptions from what they say in the classroom discussion. I think that these methods will be effective because they require the students to draw their own conclusions and I will be able to effectively gauge where they are in reference to the concept. The unit exam will be a final assessment at the end of the unit to overview all of the concepts and ensure that the students have understood the material and implied concepts. |
| 3. Define the characteristics of Prokaryotes and Eukaryotes.  4. Differentiate between whether or not a particular organism is a prokaryote or eukaryote when presented with various organisms. | Exam  Quiz  Essay  Worksheet  Activity participation  Lab participation  Presentation | Unit exam  Worksheet | Using the worksheet that had the students tell whether an organism was multicellular or unicellular. This will require them to use what they have learned about the qualities of unicellular and multicellular organisms. The unit exam will be a final assessment at the end of the unit to overview all of the concepts and ensure that the students have understood the material and implied concepts. |
| 5. Relate concept of the cytoplasm to a real life example.  6. Name the various cellular structures given a diagram of a cell, nucleus, nucleolus, ribosome, endoplasmic reticulum, Golgi apparatus, lysosome, vacuole, mitochondria, chloroplast, cell membrane, and cell wall.  7. Describe the functions of the structures of a cell. (listed previously)  8. Construct an animal or plant cell out of paper, complete with all listed organelles.  9. Determine the differences between chromatin and chromosomes.  10. Explain the purpose of vacuoles in cells and what would happen to a cell if there were no vacuoles.  11. Differentiate between mitochondria and chloroplasts.  12. Describe how both plant and animal cells attain energy.  13. Predict how the cell retains its’ structure. | Exam  Quiz  Essay  Worksheet  Activity participation  Lab participation  Presentation | Presentation  Activity participation  Worksheet  Unit exam | The presentation that the students will make, will allow me to be able to see how much of each topic they have conquered. Then throughout the class watching the presentations, they will also be able to teach the other students the material somewhat as well. Following each of the presentations, I will review what they said and fill in the gaps in information. Using the students filled out note worksheets, I will be able to see what exactly each of the students was thinking and taking in. Also, I will be to see if the students understood the components of the cell by their construction of the contents of a cell in the group cell creation activity. If the groups are lacking some essential component or components, I will be able to address their misunderstanding directly and firmly. The unit exam will be a final assessment at the end of the unit to overview all of the concepts and ensure that the students have understood the material and implied concepts. |
| 14. Identify the composition of the lipid bilayer.  15. List what type of molecules that can pass through the cell membrane without assistance.  16. Describe the function of the cell wall.  17. Define selectively permeable membrane. | Exam  Quiz  Essay  Worksheet  Activity participation  Lab participation  Presentation | Activity participation  Worksheet  Unit exam | Their accurate participation in the role playing activity will help me determine if they truly comprehend the concept of the selectively permeable membrane. I will be able to do this by seeing if they are able to follow the instructions of the activity and go through the membrane only when their molecule would be able to. Also, using the worksheet I can tell if they understand the concepts of the cell membrane and cell wall by asking them mentally stimulating questions such as what happened in the activity on a molecular level. The unit exam will be a final assessment at the end of the unit to overview all of the concepts and ensure that the students have understood the material and implied concepts. |
| 18. Define concentration and explain how it changes through a concentration gradient.  19. Show how equilibrium is attained in a cell through the various transportation mediums.  20. Apply the concepts of diffusion to the dye activity.  21. Define diffusion, osmosis, facilitated diffusion, active transport, exocytosis, endocytosis, hypertonic, and hypotonic solutions.  22. Describe how osmosis through different solutions with various concentrations.  23. Conclude how molecules move through a selectively permeable membrane, given an iodine permeability activity.  24. Diagram how endocytosis and exocytosis occur. | Exam  Quiz  Essay  Worksheet  Activity participation  Lab participation  Presentation | Activity participation  Worksheet  Unit exam | The various activities that I prepared for these abstract concepts, should be able to help students visualize what is going on a molecular level through diffusion. If students are actively participating in the activities I will be able to see whether or not they understood the concept via the supplemental worksheet. The worksheet will also have the material from the videos on exocytosis, endocytosis, and the other various forms of transport. The unit exam will be a final assessment at the end of the unit to overview all of the concepts and ensure that the students have understood the material and implied concepts. |
| 25. Identify organisms as multicellular or unicellular.  26. Define unicellular, multicellular, and cell specialization.  27. List five different types of specialized cells in humans. | Exam  Quiz  Essay  Worksheet  Activity participation  Lab participation  Presentation | Worksheet  Unit exam | I will just use a worksheet to see whether or not my students were able to memorize the qualities of unicellular and multicellular organisms and differentiate between the two. The unit exam will be a final assessment at the end of the unit to overview all of the concepts and ensure that the students have understood the material and implied concepts. |
| 28. Name the different levels of organization of multicellular organisms.  29. Categorize sample structures into the levels of organization of multicellular organisms.  30. Describe how the digestive system in humans is formed down to the individual cells. | Exam  Quiz  Essay  Worksheet  Activity participation  Lab participation  Presentation | Worksheet  Activity participation  Unit exam | The worksheet that I would use would be able to see if the students understood and took information from the videos presented about the organization of cells in the human body. I would use the activity participation grade to determine if they did their part in their mini research project. Pending their participation, I will be able to see whether or not they gained something from preparing the final project. The unit exam will be a final assessment at the end of the unit to overview all of the concepts and ensure that the students have understood the material and implied concepts. |
| 31. Exhibit proper laboratory technique.  32. Use a microscope to effectively view cells on a sample slide.  33. Apply concepts of cellular structure to the observation of the onion and cheek cells.  34. Conclude the outcome of the changes in concentration of the hypertonic and hypotonic solutions.  35. Design an experiment that uses cells to exhibit hypertonic/hypotonic solutions. | Exam  Quiz  Essay  Worksheet  Activity participation  Lab participation  Presentation | Lab participation  Worksheet  Essay | The efforts of the student to use the lab equipment would both help me grade them and would help me determine if they learned the material. The use of the worksheet with the lab activity will allow me to see if the students were able to see the contents of the microscope and were able to determine what was going on under the microscope. The essay component would be based in the student’s ability to design a relatively similar experiment and present what they predict would happen in essay format. This would help me determine whether or not they were able to grasp what an experiment is and how to design it. The unit exam will be a final assessment at the end of the unit to overview all of the concepts and ensure that the students have understood the material and implied concepts. |

Use the table below to complete part 8 of your Unit Plan Assignment.

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| Science Laboratory Skill | Related Objective(s)? | Teaching Strategy? |
| Design an experiment using hypotonic or hypertonic solutions and cells. | 35. Design an experiment that uses cells to exhibit hypertonic/hypotonic solutions. | Laboratory activity, I will have the students do a similar activity with hypotonic and hypertonic solutions and cells. I will challenge them to design a similar experiment with a different type of cell. |
| Using microscopes to view cells and determine their structures and speculate for their functions. | 32. Use a microscope to effectively view cells on a sample slide.  33. Apply concepts of cellular structure to the observation of the onion and cheek cells. | Laboratory activity, students will be using microscopes and slides to view and alter various types of cells and particular aspects. The students will also be manipulating red blood cells with iodine under the slides. |

**Unit Plan Overview (Part 9)**

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| **Day** | **Objective** | **Teaching Strategy** | **Assessment Strategy** | **Notes** |
| 1 | 1. Describe and recreate the drawings that Hooke made of the cell given a microscope slide of cork.  2. List all three components to the Cell Theory.  3. Define the characteristics of Prokaryotes and Eukaryotes.  4. Differentiate between whether or not a particular organism is a prokaryote or eukaryote when presented with various organisms. | Lecture  Laboratory activity  Worksheet  Class discussion | Worksheet  Activity participation  Unit exam | Allow the students to look at the cork cells and jump to their own conclusions before you explain to them what exactly Hooke saw under his microscope. Make sure that the Cell Theory worksheet doesn’t just list the components of Cell Theory. Let the students have to discover the components on their own. |
| 2 | 5. Relate concept of the cytoplasm to a real life example.  6. Name the various cellular structures given a diagram of a cell, nucleus, nucleolus, ribosome, endoplasmic reticulum, Golgi apparatus, lysosome, vacuole, mitochondria, chloroplast, cell membrane, and cell wall.  7. Describe the functions of the structures of a cell. (listed previously) | Lecture  Worksheet | Group presentation  Activity participation  Unit exam | Make sure to not reveal too much information about the organelles so as to not make their presentations too redundant. Keep the students somewhat guessing until after all of the presentations. |
| 3 | 8. Construct an animal or plant cell out of paper, complete with all listed organelles.  9. Determine the differences between chromatin and chromosomes.  10. Explain the purpose of vacuoles in cells and what would happen to a cell if there were no vacuoles. | Lecture  Hands on activity  Worksheet | Activity participation  Worksheet  Unit exam | Don’t forget to tell the students to have the functions of each organelle they put on their cell project listed somewhere on the project. Also, have the students show a process system within the cell on their project too. |
| 4 | 11. Differentiate between mitochondria and chloroplasts.  12. Describe how both plant and animal cells attain energy.  13. Predict how the cell retains its’ structure. | Lecture  Class discussion  Worksheet | Discussion participation  Worksheet  Unit exam | Make sure to structure the class discussion to how cells get energy, how organisms use energy, and how the cell retains its structure, so that the students are all engaged. Ask relevant questions that will stir debate among students. |
| 5 | 14. Identify the composition of the lipid bilayer.  15. List what type of molecules that can pass through the cell membrane without assistance.  16. Describe the function of the cell wall.  17. Define selectively permeable membrane. | Lecture  Role play  Worksheet | Worksheet  Activity participation  Unit exam | During role play make sure that all students are engaged. There could be times when the membrane students will stand there but make sure that the class is switching roles often to ensure all students get to be different roles. |
| 6 | 18. Define concentration and explain how it changes through a concentration gradient.  19. Show how equilibrium is attained in a cell through the various transportation mediums.  20. Apply the concepts of diffusion to the dye activity.  21. Define diffusion, osmosis, facilitated diffusion, active transport, exocytosis, endocytosis, hypertonic, and hypotonic solutions. | Hands on activity  Lecture | Activity participation  Worksheet  Unit exam | Prepare the food dye and the water before class begins. Do not explain much background before having the students dive into the activity. This will ensure that any observations they make will be their own. Once the activity is complete, supplement what the students concluded with the supported information. |

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| --- | --- | --- | --- | --- |
| **Day** | **Objective** | **Teaching Strategy** | **Assessment Strategy** | **Notes** |
| 7 | 22. Describe how osmosis through different solutions with various concentrations.  23. Conclude how molecules move through a selectively permeable membrane, given an iodine permeability activity.  24. Diagram how endocytosis and exocytosis occur. | Lecture  Video  Hands on activity  Worksheet | Activity participation  Worksheet  Unit exam | Get the right bags and allow students to perform iodine transfer don’t just do it for the entire class to see. Allow the individual students, or small groups of students, to see the selectively permeable nature of the bags. |
| 8 | 25. Identify organisms as multicellular or unicellular.  26. Define unicellular, multicellular, and cell specialization.  27. List five different types of specialized cells in humans.  28. Name the different levels of organization of multicellular organisms.  29. Categorize sample structures into the levels of organization of multicellular organisms. | Lecture  Picture analysis  Video  Worksheet | Worksheet  Unit exam | Make sure that students understand how cells come together to form various structures so that they are prepared to complete the mini research project. |
| 9 | 30. Describe how the digestive system in humans is formed down to the individual cells. | Mini-research project  Worksheet | Project participation | This class time should be used in a computer lab, make sure to lay the proper foundation to guide the students to their desired information. |
| 10 | 31. Exhibit proper laboratory technique.  32. Use a microscope to effectively view cells on a sample slide.  33. Apply concepts of cellular structure to the observation of the onion and cheek cells.  34. Conclude the outcome of the changes in concentration of the hypertonic and hypotonic solutions. | Lecture  Laboratory activity | Lab participation  Worksheet | Make sure that the red blood cells are of usable quality and cleanliness. Be sure to lecture about safety procedures and lab procedures. |
| 11 | 35. Design an experiment that uses cells to exhibit hypertonic/hypotonic solutions. | Lecture  Essay | Essay | Review activity at the beginning of class then allow the students to work on designing their experiment after. |
| 12 | Unit exam | Unit exam | Unit exam | Ensure that objectives are tested on the exam. Use various means to write questions. |

Use the table below to complete part 10 of your Unit Plan Assignment.

|  |  |  |  |
| --- | --- | --- | --- |
| Units Preceding This One | Reasoning | Unit Following This One | Reasoning |
| Introduction to Biology and the Variability of Life (Biodiversity that is made of cells) | Having this unit before the cell structure and function unit would benefit the students if they did not have a strong biological background. Exploring the diversity of life briefly would allow them to get a background with which they could apply the concepts of cell structure and function to. For example, if you are talking about cell specialization, and you talk about stomata on cactus and the student doesn’t know what a cactus is they will have difficulty understanding. The full breath of biodiversity could be visited later at the appropriate time. | Genetics or Meiosis and Mitosis | Once the student has become familiar with the structures and functions of the cell they will then be more able to understand the concepts in these units. If they had been introduced these concepts before they had been given a firm background in cellular mechanisms and qualities, it would be difficult for them to grasp the concepts without a solid mental visualization of a cell. |